

Discussion

History of this filing

This application was filed on September 29, 2003. The first Examiner's office action issued on February 4, 2005. Amongst the references cited were the published applications of Fritzke, US-2002/0091022 and Vacek et al, US-2004/0209716. Of these two references, only Vacek, along with a further patent to Easton et al, US 5,364,095, was cited as being anticipatory to the claims of the present application in the first Examiner's office action. In that first action the Examiner relied upon the strengthening layer 112 as identified in Figure 2 of Vacek as being anticipatory of the feature of having a midsection of a bat barrel with greater radial stiffness than the two lateral regions. Fritzke was applied under 35 USC 103 (a) to certain of the claims.

The applicant replied to this office action on June 27, 2005 cancelling claims 1 to 13 and introducing Claims 14-45. On August 4, 2005 the Examiner issued the restriction requirement distinguishing between each of the embodiments as referenced in Figures 4, 5, 6, 7 and 8. The applicant responded to this election requirement on August 31, 2005 by electing Figure 6 and by including further amendments to the claims. Amongst these claims were claims 19, 20, 21, 23 and 41 which addressed the thickening of the mid-section of the bat barrel.

The Examiner's next office action of October 4, 2005, which was made final, applied Fritzke as well as Vacek as primary anticipatory references. The Examiner in this office action withdrew a number of claims, including claims 21-30 and claim 41, from examination as being drawn to a non-elected invention. These withdrawn claims related to the thickness characteristic of the mid-section of a bat barrel. The Examiner specifically stated that no support is found for the characteristic of a 5% thickness differential with regard to the Figure 6 embodiment.

This withdrawal of claims as not finding support in the Figure 6 embodiment has created considerable complications for the applicant in advancing this application. The applicant has objected in further Responses that such claims should not be withdrawn and the Examiner has reiterated his withdrawal of claims, particularly claims relating to the thickness of the mid-section of the barrel wall, on this basis that such claims are not attributable to the species of Figure 6.

The applicant replied to the October 4, 2005 office action with a Response dated December 22, 2005 which included an RCE. That Response contested the withdrawal of thickness-related claims and asserted a further series of claims 46 – 51, which further addressed the thickening of the mid-section of the bat barrel. That Response argued that the thickness disclosures in the specification were relevant to the species of Figure 6 as the text with respect to Figure 6 referred to thickness as a parameter. Additionally, claims were then being tendered as of December 22, 2005, which relied upon the characteristics of graph Figure 10.

The Examiner's next office action of February 7, 2006, which was non-final, again objected to the advancement of claims, which the Examiner said were based upon disclosures in the specification which were not directed to Figure 6. This rejection was specifically directed to any reference to the graphical characteristics of Figure 10 in applicant's claims. Many of the applicant's principal claims, including claims previously pending but not withdrawn by the office action of October 4, 2005, were withdrawn from examination on this basis.

The applicant filed a Response on June 7, 2006. Additional Figures 6.1-6.3 depicting increased thickness were tendered to clarify the disclosure in the text of increased thickness respecting Figure 6. And additional Claims 53-71 were introduced, many of which were directed to thickness characteristics of the mid-section of the barrel.

The Examiner issued a further office action on July 14, 2006 addressing the June 7, 2006 Response. This present Response addresses this last office action which was made final.

Examiner's office action of July 14, 2006

The Examiner objected to the introduction of new Figure 6.1-6.3 as constituting new matter. The Examiner refused to address claims 53-71 as being based on the embodiments as depicted in Figures 6.1 and 6.3. The legitimacy of these figures will be addressed further below.

It is to be noted that the Examiner did not treat Figures 53-71 as being withdrawn on the cover sheet. Rather these claims are stated to be "subject to restriction and/or election requirement". In the body of the office action, these claims are said to be withdrawn on the basis of 37 CFR 1.142 (b) and MPBP section 821.03.

37 CFR 1.142 (b) and the sections relevant thereto provide as follows:

§ 1.142 Requirement for restriction.

- (a) If two or more independent and distinct inventions are claimed in a single application, the Examiner in an Office action will require the applicant in the reply to that action to elect an invention to which the claims will be restricted, this official action being called a requirement for restriction (also known as a requirement for division). Such requirement will normally be made before any action on the merits; however, it may be made at any time before final action.
- (b) Claims to the invention or inventions not elected, if not canceled, are nevertheless withdrawn from further consideration by the Examiner by the election, subject however to reinstatement in the event the requirement for restriction is withdrawn or overruled.

37 CFR 1.145 Subsequent presentation of claims for different invention.

If, after an office action on an application, the applicant presents claims directed to an invention distinct from and independent of the invention previously claimed, the applicant will be required to restrict the claims to the invention previously claimed if the amendment is entered, subject to reconsideration and review as provided in 37 CFR 1.143 and 37 CFR 1.144

§ 1.143 Reconsideration of requirement.

If the applicant disagrees with the requirement for restriction, he may request reconsideration and withdrawal or modification of the requirement, giving the

reasons therefor. In requesting reconsideration the applicant must indicate a provisional election of one invention for prosecution, which invention shall be the one elected in the event the requirement becomes final. The requirement for restriction will be reconsidered on such a request. If the requirement is repeated and made final, the Examiner will at the same time act on the claims to the invention elected.

§ 1.144 Petition from requirement for restriction.

After a final requirement for restriction, the applicant, in addition to making any reply due on the remainder of the action, may petition the Director to review the requirement. Petition may be deferred until after final action on or allowance of claims to the invention elected, but must be filed not later than appeal. A petition will not be considered if reconsideration of the requirement was not requested.

The applicant requests reconsideration and withdrawal of this restriction requirement respecting Claims 53-71. In the response that follows, the applicant provides reasons for this request. The principal basis for this request is that the species of Figure 6 is specifically attributed as including a barrel were in the mid-section has been thickened in order to broaden the sweet spot. Claims 53-71 address this characteristic.

The Examiner stated: "no support has been offered for showing that the original disclosure intended to include the Figure 6 embodiment with the limitations discussed with reference to Figures 4, 5, 7 and 8." As stated previously, the withdrawal of claims as not finding support in the Figure 6 embodiment has created considerable complications for the applicant in advancing this application. The applicant acknowledges that the species of Figure 6 is under examination pursuant to the earlier restriction requirement of the Examiner. However, it is wrong for the Examiner to withdraw from examination claims that are directed to features of the invention that are not *ipso facto* depicted in Figure 6. The applicant did not elect Figure 6; the applicant elected the species of Figure 6. Figure 6 is simply a convenient indicator of the species of the invention that is described further in the disclosure. The applicant submits that the greater part of the disclosure can be attributed to Figure 6.

The applicant attaches as Schedule C a shortened version of the original disclosure as filed, selecting portions which have been highlighted as being clearly associated with Figure 6. These highlighted portions are not the only portions that are relevant to Figure 6. But these portions have been highlighted to bring-home to the Examiner that the disclosure must be taken as a whole in appreciating the characteristics that may be assigned to Figure 6.

It is the position of the applicant that, where characteristics are explicitly attributed to one or another variant of the invention in the course of the written disclosure, it should be understood that such characteristics are intended to apply to all other variants of the invention where such characteristics are appropriate or compatible with such other variants. Thus for example, when paragraph [0050] states:

"[0050] The bats of the present invention, shown in Figs. 4, 5, 6, 7 and 8 have similar dimensions to the foregoing prior art bats shown in Figs. 1, 2 and 3."

In this example, it should be taken that all of the species of the invention may be associated with the information and data that is so referenced, whether or not the additional recital "shown in Figs. 4, 5, 6, 7 and 8" is included in the text of the disclosure.

Applying this reasonable policy, it is legitimate for the applicant to introduce into the claims features of the invention that are expressly attributed to other variants of the invention and which are inferable as being characteristics that are suited to the elected species. This is in contrast to the policy of the Examiner who, relying on the species election, now proposes to divide-up the disclosure into watertight compartments, effectively denying the right of the applicant to rely upon characteristics that have been disclosed in the original application. Effectively, the Examiner is endeavoring to apply a new-matter objection across portions of the written disclosure.

This is not a case where five independent inventions have been described, supported by five separate descriptions that do not relate to each other. This is not even a case where five distinct inventions having individually independent characteristics have been described. All of the five species, Figures 4, 5, 6, 7 and 8 identified by the Examiner relate to baseball bats which are designed to exhibit the characteristic of having a broadened sweet spot. All of these variants share common characteristics. It is on this basis that the applicant states that, where characteristics are explicitly attributed to one or another variant of the invention in the course of the written disclosure, it should be understood that such characteristics are intended to apply to all other variants of the invention where such characteristics are appropriate or compatible with such other variants.

Withdrawal of Claims 53-71

The Examiner has objected that Claims 53-71 are subject to restriction and/or election requirement, and, in the body of the office action, these claims are said to be withdrawn on the basis of a restriction requirement under 37 CFR 1.142 (b) and MPBP section 821.03. The applicant will now show that Claims 53-71 should not be subject to a restriction and/or election requirement and asks the Examiner to reconsider his ruling in this respect.

The Examiner has withdrawn Claims 53-71 as being independent or distinct from the invention originally claimed as being directed to Figures 6.1 and 6.3. The Examiner characterizes Claims 53-71 as being directed to a bat having a thickened central barrel portion and bases his withdrawal of these claims on his parallel rejection of Figure 6.1 and 6.3 as constituting new matter. While the status of Figure 6.1-6.3 will be reviewed further below, the applicant will now show that Claims 53-71 are directed to the species of Figure 6 and should be subject to examination irrespective of the status of Figures 6.1- 6.3.

Claims 53-71 are directed to the species of Figure 6

Claim 53 has been amended to stipulate that it is directed to baseball bats were in the barrel consists essentially of polymer composite material. This makes Claim 53 more nearly parallel with claims 37, 38 and 39. The applicant reserves the right to reassert claims addressing the scope of Claim 53 before this amendment in further filings. But for the purpose of this filing, Claim 53 as with Claims 37, 38 and 39, addresses the polymer composite aspect of the species of Figure 6.

Schedule C is replete with teachings that broadening of a sweet spot can be obtained by increasing the radial stiffness of the mid-section portion of a barrel, as compared to the radial stiffness of the two lateral regions, by the mechanism of increasing the thickness of the midsection. Reference is made to paragraph 17, 18, 53, 62 and 64. Reference is also made to original Claims 12 and 13. Paragraph 64 specifically addresses Figure 6 and makes express reference to thickening of the barrel. Although Paragraph 62 begins by describing the stiffener 18, this paragraph concludes:

" Though not shown, an alternative solution (since stiffness is proportional to thickness) to the stiffener 18 is to vary the barrel thickness 6 along the barrel length 1, either full length or any portion of the barrel length 1 in order to vary bat performance."

This reference to thickening of the barrel as an alternative to the stiffener 18 links the data respecting stiffener 18 into the thickening concept of Figure 6. Similarly, paragraph 53 not only refers to the composite parameters for increasing radial stiffness in a polymer composite barrel but also makes reference to increasing "the thickness of the polymer composite structure".

Clearly increased thickness in the mid-section of the barrel is a characteristic of the species of Figure 6 and Claims 53-71 should be placed under examination as being directed to the species of Figure 6. Paragraph 64 specifically addresses Figure 6 and makes express reference to thickening of the barrel. Claims 53-71 should be placed under examination irrespective of the status of Figures 6.1- 6.3.

Further submissions on this point are provided in the Response as set out below.

Examiner's new matter objections- amendments to text

The Examiner objected to the new disclosure with regard to Figure 6 in paragraph 62 as lacking support in the original disclosure. The only amendment made in the last Response to paragraph 62 was in respect of the 8 1/3 percent differential in the thickened portion of the barrel wall. In the Response of June 27, 2005 the applicant made earlier amendments introducing into the disclosure this 5% the differential which was referenced in claim 13 of the original application. Then the applicant changed this value to 8 1/3 %. The applicant is amending paragraph 62 to restore the thickness differential referenced in the text to 5% from 8 1/3 %. This is being made without prejudice to the right of the applicant to assert such an amendment in a future application.

The Examiner also states with respect to paragraph 62 that:

"...the more narrowly focused ranges of the stiffener wall thickness, and the inclusion that the barrel wall thickness is also in these ranges represents subject matter with no support in the original disclosure."

The applicant is presently deleting the following concluding sentence from paragraph 62 that refers to sub ranges for stiffener thickness:

"Just as the stiffener wall may be typically in the order of .005 inches to .040 inches in thickness, or .010 inches to .040 inches in thickness, or .015 inches to .040 inches in thickness, or 0.015 inches to 0.030 inches, so too the analogous increase in barrel wall thickness along the mid-section may fall within the same ranges."

This change is being made without prejudice to the right of the applicant to assert such an amendment in a future application.

The applicant objects to the suggestion by the Examiner (page 3, second full paragraph) that the applicant can only introduce amendments into the disclosure that pertain to Figure 6. The applicant should be entitled to introduce into the disclosure any amendments that are supported by the original disclosure, notwithstanding the restriction requirement that is focusing examination on the species of Figure 6.

On this basis, the applicant asserts that it has the right to retain in the disclosure the following previously amended passage in paragraph 62:

"Analogous to Figures 4, 5, 7 and 8 an alternative solution (since stiffness is proportional to thickness) to the stiffener 18 is to vary the barrel thickness 6 to the same extent and manner along any portion of the barrel length 1 of any bat according to the invention, including the bat of Figure 6, in order to vary bat performance."

This passage was introduced in the Response dated December 22, 205 and the Examiner did not object to this amendment in his office action of February 7, 2006. This amendment, as submitted earlier, falls in the class of a disclosure that was inferable from the original text is filed.

The Examiner has objected to the amendments to paragraph 53 on the basis that there is no support for forming the thickened portion such that no boundary is present between the layers. The text of the words is last added to the disclosure in this paragraph is being amended to read as follows:

"Such thickened polymer composite material is integrally formed with the barrel wall portion whereby the thickened portion is formed of the same polymeric material as the underlying barrel wall portion without there being present a boundary therebetween ~~whereat different materials are in contact with each other.~~

The concluding words: " whereat different materials are in contact with each other" are being deleted as redundant, but the balance of the text is being retained on the basis it is inherent in the nature of a polymer composite material that a thickened layer would present this characteristic. This is inferable from the original disclosure and does not constitute new matter.

The Examiner objected to the amendment of paragraph 64 which inserted reference to "layout density" into the text of this paragraph as being new matter. The Examiner also objected that no definition of this term was offered.

The Examiner is referred to paragraph [0053]. As originally filed which stated as follows:

"However, with composite materials, which are preferred, properties of bats made in accordance with the present invention, such as radial stiffness which determines bat performance can be controlled (i.e. designed to a given requirement) by altering such parameters as the fiber alignments along the bat length 1, and/or the type of fibers chosen, their dencier or *layout density* and/or the thickness of the polymer composite structure."

The highlighted words occur in the context of altering: "the type of fibers chosen, their denier or *layout density*". Clearly the reference is to fiber layout density which is an easily understood concept. Further amendment to paragraph 62 to add the word "fiber" is being presently made. Additionally, paragraph [0053] is being amended to add:

"(i.e. higher percentage of fiber)"

to add clarity and parallel claim 38. No new matter has been added.

Features attributable to Figure 6

If the Examiner is objecting to the recital that the feature of a minimum 5% thickness differential in the mid-section portion of a bat barrel is not a characteristic which is attributable to the species of Figure 6, Examiner's attention is drawn to original claims 12 and 13 which read as follows:

"12. A tubular baseball bat comprising a cylindrical handle portion for gripping, a cylindrical tubular barrel portion for striking, and a tapered mid-section connecting said handle and barrel portion, wherein said barrel portion's thickness varies over said barrel portion's length.

"13. A bat according to claim 12 wherein said barrel portion's thickness is at least 5% thinner, at either or both end portions of said barrel portion, than the central portion of said barrel portion."

It is noted that these claims follow directly after Claim 10 which addresses a bat made of polymer composite material. Further, Claims 11 and 12 address all embodiments of the invention wherein the improvement of a broadened sweet spot is achieved by thickening the mid-section of the bat barrel. The text of the original disclosure with respect to Figure 6 clearly taught that the species of Figure 6 could be provided with the requisite degree of increased radial stiffness in the mid-section by providing a mid-section of increased thickness. Accordingly, there is a basis in the specification for attributing the 5% thickness differential to the species of Figure 6.

Similarly, the characteristics of the stiffener 18 identified in paragraph 62 as typically being in the order of .005" to .040" thick with length 2" to 6" which is typically less than 50% of the barrel length are also attributable to Figure 6. This same paragraph 62 ends by stating:

"Though not shown, an alternative solution (since stiffness is proportional to thickness) to the stiffener 18 is to vary the barrel thickness 6 along the barrel length 1, either full length or any portion of the barrel length 1 in order to vary bat performance."

No stronger association between the mechanical characteristics of the stiffener 18 and the thickening of an integral portion of the barrel wall could be inferred. The use of "an alternate solution" shows that the wall thickening is intended to be equivalent to the stiffener. Accordingly, all of the characteristics of the stiffener are attributable to the thickened barrel wall variant of the species of Figure 6.

Amendments to Figures 6.1-6.3

The Examiner objected to the entry of the previously presented Figures as constituting new matter. These figures all address configurations resulting in increased radial stiffness generally confined to the sweet spot area of the barrel portion and associated with Figure 6. The Examiner has not required that tendered drawings be canceled from the specification, and the applicant assumes that such tendered drawings have not been entered, as stipulated in the MPEP- 608.04: 714.19 (J).

The applicant has tendered alternate copies of these Figures amended in a respect as indicated below. In order to ensure that these alternate figures are described, the descriptions of such figures have been resubmitted as a fresh amendment herein.

However, the applicant traverses the Examiner's rejection of Figures 6.1 - 6.3 on the basis that the applicant disagrees with the Examiner's statement: "...there is no original disclosure of a thickened portion shaped as shown in the drawings". And in respect of Figure 6.2 that: "..there is not original disclosure of a tapered inner wall at the junction of the barrel and the bat taper".

Submissions to support entry of New Figures 6.1-6.3

In respect to the scope of amended drawings, both previous and present, the Examiner's attention is drawn to 37 CFR 1.81 (d) which reads as follows:

1.81 (d) Drawings submitted after the filing date of the application may not be used to overcome any insufficiency of the specification due to lack of an enabling disclosure or otherwise inadequate disclosure therein, or to supplement the original disclosure thereof for the purpose of interpretation of the scope of any Claim.

Accordingly, the amendments in the proposed revised drawings as tendered are not intended to provide support for any of the Claims, but rather to provide clarification for the text in the disclosure referring to the Figure 6 embodiment.

The original paragraph [0064] referring to Figure 6, not including all of the amendments entered without objection by the Examiner to date (or the reference to "layout density" as discussed above), is presented in full in Schedule C. Figure 6 is characterized as depicting an "all polymer composite baseball bat". However, this is not the only passage in the original disclosure that references the embodiment of Figure 6. In the original filing paragraph [0020] contributes to the characterization of the species of Figure 6.

In the original paragraph [0064] the following key statement is made:

"Though not shown, the fiber types, and/or fiber angles, and/or fiber sizes, and/or composite thickness can be designed such as to graduate the radial stiffness of the barrel portion 1 along its entire length. That is, the radial stiffness could be highest in the peak performance area (generally the sweetspot area 19) and gradually changing in uniform increments towards the barrel ends where the radial stiffness would be lowest."

In parallel, in original paragraph [0020] the further important statement is made in respect of "all polymer composite baseball bats" made in accordance with the invention, namely that such bats may be made by:

"graduating the radial stiffness of the barrel portion along the entire barrel length. Specifically, the peak performance area (generally the sweetspot area) is designed to have the highest radial stiffness while the area of the barrel portion nearest the taper and barrel ends have the lowest radial stiffness and with the barrel portion between the sweetspot and barrel ends being graduated."

The last underlined portions clearly parallel the words in paragraph [0064] which immediately follow the reference to using thickness as a means of controlling radial stiffness. This further associates the feature of using a region of increased barrel thickness to provide a mid-section portion of the barrel that has higher radial stiffness.

These quotations have been excerpted from the pending application in order to show that the applicant does not need to rely upon Figures 6.1-6.3 in order to advance the claims being submitted in the present Response. Nevertheless, the applicant wishes to have these figures included because of the clarifying effect that they have.

Examiner's basis for rejecting Figures 6.1-6.3

The Examiner, in his office action of July 14, 2006 has acknowledged as follows (page 2):

"Variations (on Fig 6), not shown, on this embodiment could include double or multi-walled bats or increased thickness in the barrel portion."

Yet on page 3 of the Examiner's office action the following statement is made:

"Regarding the Figs 6.1 and 6.3 there is no original disclosure of a thickened portion shaped as shown in the drawings. In Figure 6.2 there is not original disclosure of a tapered inner wall at the junction of the barrel and the bat taper."

On this basis, the Examiner has objected that added Figures 6.1-6.3 contain new matter.

Accordingly, the Examiner's objection to Figures 6.1-6.3 would seem to be directed, not to the fact that they depict a thickened portion of the barrel wall, but that they depict a tapered transition zone at the boundaries of the thickening.

It is to be noted that no claims in this present pending application are based upon the shape of the transitional zone at the boundaries of the thickening in the barrel wall. The applicant reserves its rights to pursue claims of any shape supported by the original disclosure in subsequent filings.

It is also to be noted that, as the Examiner is no doubt aware, that US patent 6,949,038 has issued on a patent by Fritzke with claims that stipulate, in respect of an insert within the barrel portion of a bat, for the feature that:

"the wall thickness of the first tubular wall transition region generally increasing along the longitudinal axis from a first position, generally near the proximal end, toward the distal

end, and the wall thickness of the second tubular wall transition region generally increasing along the longitudinal axis from a second position, generally near the distal end, toward the proximal end.."

In filing the amended Figures 6.1-6.3 as previously tendered, the applicant was not intending to provide support for claims directed to such a feature. Besides, 37 CFR 1.81 (d) would not allow a claim to be based upon support arising from an amended Figure. Nevertheless, the applicant continues to rely on other portions of the disclosure which may address such a feature.

The Examiner's concern for the shape of a thickened portion of the barrel wall in the applicants proposed amended drawings is not justified. The original proposed amended Figures 6.1-6.3 simply demonstrate what would naturally be understood by the words provided in paragraphs [0020] and [0064] of the disclosure. The underlined passages from paragraph [0064], above, clearly refers to the concept that:

[0064]composite thickness can be designed such as to graduate the radial stiffness of the barrel portion 1 along its entire length. That is the radial stiffness could be highest in the peak performance area (generally the sweetspot area 19) and gradually changing in uniform increments towards the barrel ends

Accordingly, the applicant submits that the Examiner should have accepted the original previously presented Figures 6.1-6.3

Nevertheless, out of an abundance of caution, the applicant tenders herewith alternate Figures 6.1-6.3 which show the ends of the thickened portion and the end of the insert as terminating in a more abrupt ending than a tapered ending.

In the previous Response, the applicant submitted amendments to the description of the figures in order to identify Figures 6.1-6.3. On the possibility that those amendments were not entered, they are resubmitted herewith in Schedule B.

Claims 53-71

The applicant has elaborated reasons why the first proposed Figures 6.1-6.3 should have been accepted by the Examiner because the Examiner appears to have withdrawn Claims 53-71 from examination on the basis that these Claims were to be supported by the proposed Figures 6.1-6.3 and that, having rejected the entry of Figure 6.1-6.3, Claims 53-71 were directed to a non-elected invention. Again, relying upon 37 CFR 1.81 (d) and the excerpts from the text of the disclosure as exemplified above, the applicant submits the Claims 53-71 are nevertheless directed to an elected invention and ask that the Examiner allow those claims to be subject to continued examination.

On the basis that Claims 53-71 are directed to the embodiment of Figure 6 these claims have been amended in the following respects.

Claim 53 has been amended to add the limitation:

" wherein the barrel wall of the barrel portion consists essentially of polymer composite material"

This makes this claim parallel in character to Claims 37, 38 and 39. On the basis that this amendment introduces a distinguishing characteristic to Claim 53, the other limitations previously present in claim 53 have been moved, by amendment, to Claims 54, 55 and 56. Thus the 5% and 0.005 to 0.040 inches limitations are being deleted from Claim 53 in favor of their reintroduction into dependent Claims 54 and 55 for reasons explained further below. The stipulation of there being no boundary present between the thickened portion and its underlying layer has been moved to Claim 56, but with the phrase "whereat different materials are in contact with each other" (following "without there being present a boundary") being removed as being duplicative of the limitation "formed of the same material".

Claims 57-59, 71, 72 have been deleted and the balance of the claims amended in respect of their dependencies. This results in a block of claims, namely Claims 37, 38, 39 and 53 which are all directed to the features of the embodiment of Figure 6 namely a bat having:

"[0064] ... increased radial stiffness generally in the sweetspot area 19 located in proximity to the middle area of the barrel length 1 the fiber types, and/or fiber angles, and/or fiber sizes, and/or composite thickness can be designed such as to graduate the radial stiffness of the barrel portion 1 along its entire length. "

based upon the different aspects of construction referenced in association with Figure 6. These are achieved by a bat having any one of the following characteristics:

" [0053]. ... bat performance can be controlled (i.e. designed to a given requirement) by altering such parameters as the fiber alignments along the bat length 1, and/or the type of fibers chosen, their dernier or layout density and/or the thickness of the polymer composite structure.

Accordingly, the applicant submits that the Examiner should have addressed claims 53-71 and asks that the Examiner issue another office action in reply to this Response as if the present office action was not final. In other words, because the Examiner has failed to address Claims 53-71 of the applicant's last submission, the applicant requests that the final status of the Examiner's last office action be withdrawn in respect of those claims. Or, equivalently, the applicant requests that the amendments presently tendered in respect of those claims be entered.

On the prospect that the Examiner will allow further examination of Claims 53-71 and will withdraw the final status of the most recent office action, the applicant has tendered herewith amendments to those Claims.

Claims 53 directed to the species of Figure 6

Claim 53 as now amended is clearly directed to the species of Figure 6 on the basis that the limitations of Claim 53 as amended which read as follows:

" wherein the barrel wall thickness in the barrel mid-section that contains the sweet spot area is greater than the thickness of the barrel wall in the lateral regions and

wherein the barrel wall of the barrel portion consists essentially of polymer composite material"

to provide the barrel wall with a radial stiffness in the mid-section that is greater than the radial stiffness of the barrel wall within the two lateral regions of the barrel portion and thereby with a broadened sweet spot."

Claim 54 adds the limitation that the thickness differential is at least 5% greater than the underlying barrel wall thickness. This is supported by original Claim 13.

The limitation that: "the thickness of the total barrel wall is at least 5% greater in the barrel mid-section than in the two lateral regions" was originally present in Claim 13 of the application as filed. And Claim 13 was dependent on independent Claim 12 which was directed to a bat wherein: "said barrel portion's thickness varies over said barrel portion's length."

These claims can be taken as supporting any one of the species of the invention wherein a thickened barrel portion is used in order to provide localized stiffness. Stated alternately, as Claim 12 is part of the specification and is written in independent form, it and Claim 13 as a claim dependent thereon, apply equally to all of the species identified by the Examiner wherein reference is made to varying the thickness in the mid-section of the barrel portion of a bat. Such a reference therefore specifically applies to the species of Figure 6. On this basis, the 5% stipulation can be attributed to the species of Figure 6.

Accordingly, this is a further basis why the applicant is entitled to attribute to the embodiment of Figure 6 the limitation as originally set-out in Claim 13.

Claim 55 adds the limitation that the thickness of the total barrel wall is 0.005 to 0.040 inches greater in the barrel mid-section than in the two lateral regions. This is supported by the characterization of barrel wall thickness found it in paragraph [0062] and the statement that increased barrel thickness is an alternative to the use of a stiffener.

In Claim 56, the limitation that: "...the area of greater thickness in the barrel mid-section is integrally formed with the barrel wall portion whereby the thickened portion is formed of the same material as the underlying barrel wall portion without there being present a boundary therebetween," is inherent in the very nature of a bat which is a baseball bat which has an all polymer composite barrel, as depicted in respect of Figure 6. This is a characteristic which has been made explicit by the amendment to paragraph [0053].

Amendment to paragraph [0053]

The Examiner has objected to the amendment to paragraph [0053], such amendment being the addition of the sentence as follows (as presently presented):

[0053]...Such thickened polymer composite material is integrally formed with the barrel wall portion whereby the thickened portion is formed of the same material as the underlying barrel wall portion without there being present a boundary therebetween.

This amendment to the disclosure has been presented in order to give meaning to the expression in Claim 56 in respect of the stipulation that these Claims that: " the thickened portion is formed of the same material as the underlying barrel wall portion without there being present a boundary therebetween."

This is an inherent characteristic of a bat wall formed of a polymer composite. Paragraph [0052] of the specification as originally filed specifically describes a polymer composite as follows:

"[0052] A polymer composite is a non-homogenous material consisting of continuous fibers embedded in, and wetted by, a polymeric resin matrix whereby the properties of the material are superior to those of its constituent fibers and resin taken separately. Such polymer composites are anisotropic materials since they exhibit different responses to stresses applied in different directions depending on how the fibers are aligned or angled within the matrix." Cf, Schedule C.

Clearly, the specification discloses in respect of the species of Figure 6 a bat having a barrel wall formed of a polymeric resin matrix which will inherently give rise to a integrally formed barrel wall: whereby the thickened portion is formed of the same material as the underlying barrel wall portion without there being present a boundary therebetween. Since this is a characteristic of a bat made in accordance with the invention according to the species of Figure 6, the applicant is entitled to claim a bat characterized by this feature. The objected-to amendment is not new matter because this description is inherent in the original language of the disclosure of the application as filed.

The applicant is entitled not only to make the amendment being proposed for paragraph [0053], but also to advance claims based thereon. This includes all of Claims 56, 60, 62 and 69.

Before addressing the patentability of Claims-53-71 based on the prior art, the applicant will address the patentability of Claims 37, 38 and 39

Claims 37, 38 and 39

Turning to the rejection of Claims 37, 38 and 39, the amendment to the claims reading as follows: " consists essentially of polymer composite material" is to ensure that the intention of this limitation is not to exclude elements that do not contribute to the invention, as that would be unfair to the inventors.

The scheme of Claims 37, 38 and 39 is that these claims are all generally similar, being distinguished as follows:

37. polymer composite material containing reinforcing fibers at various angles with respect to the longitudinal axis, the reinforcing fibers present within the barrel wall of the mid-section being at a higher average angle with respect to the longitudinal axis than the average angle of the fibers within the barrel wall of the two lateral regions of the barrel portion

38 polymer composite material which contains reinforcing fibers and the barrel wall in the mid-section contains a higher percentage of fibers than in the lateral regions

39 the polymer composite material contains reinforcing fibers of types having differing stiffnesses, and the reinforcing fibers within the barrel wall of the mid-section contain a higher percentage of fibers of higher stiffness than in the lateral region

Claim 38 anticipation by Vacek based upon misconceptions

The Examiner has applied 35 USC 102 based upon Vacek (US publication 2004/9716) against Claim 38. In doing so, the Examiner has stated that (page 5):

"Vacek's insert 112 provided in the center of the barrel contains layers of fibers and thus this portion of the bat barrel has a greater percentage of fibers than do the portions of the barrel at either end of the bat insert", and,

"Vacek specifically points out.... that [the insert] enhances the hitting zone of the bat by increasing the trampoline effect. This is considered an increased or broadened sweet spot."

The applicant intends to show subsequently that these statements do not support a rejection of the applicant's Claims. Presently, the applicant will address certain of the Examiner's misconceptions respecting Vacek due to the misleading character of the Vacek disclosure.

Examiner's rejection of Claim 38 (page 5) as being anticipated by Vacek is due to lack of technical accuracy in both Vacek's drawings (Fig 1 & 2) and in Vacek's technical description (paragraph 45) leading to the Examiner's technically wrong conclusions in the first paragraph, P.5 of the Examiner's Response.

A basic universal engineering principle of elasticity law states that radial bending or stiffness in a solid body is proportional to thickness cubed and is additive in the case of multi-walls. Thus, adding Vacek's internal sleeve 112 to Vacek's outer bat body 140 decreases overall batting performance, or trampoline effect, due to the overall increase in bending or radial stiffness resulting from increased overall wall thickness. Vacek's paragraph 45 states:

"[0045] Since the sleeve 112 is made of a composite, the sleeve also provides a trampolining effect in addition to the trampolining effect of the tubular hitting surface 110 of the bat 100. The sleeve 112 is formed of a composite which is more stiff than the composite forming the tubular hitting surface 110 of the bat 100. Like the tubular hitting surface 110, the deformation of the sleeve 112 conforms to the contact area of the ball. The deformation of the sleeve 112 results in radial or hoop deformation where the sleeve 112 temporarily deforms into an oval, when viewed in cross section. Deformation of the sleeve 112 provides an additional springboard or trampoline effect which is in addition to the springboard or trampoline effect associated with the tubular hitting surface 110 of the bat 100. The trampolining effect of the sleeve 112 further enhances the hitting zone of the bat 100 and provides additional velocity to the ball when hit by the bat 100. The trampoline effect provides distance to a particular hit."

Vasek's misleading statements as underlined above have resulted in the erroneous conclusion by the Examiner that Vacek's added insert increases the trampoline effect.

With the additional insert in place in Vacek, the batting performance goes down over what would be present if there were simply the outer frame present. It's wrong for Vacek to say that there's an additional trampoline effect if this means more trampoline effect arises by adding an insert. In fact adding an insert gives rise to less trampoline effect because a thicker bat wall is stiffer.

The further conclusion by the Examiner, that Vacek increases or broadens the sweetspot beyond that of a normal doublewall bat, as claimed by the applicants, is also erroneous. There is no mention of "sweet spot" by Vacek, much less a broadening of the sweet spot, and there is no basis for the Examiner's conclusion on this point. Increasing the trampoline effect, if this is achieved, does not, of itself, broaden the sweet spot. To the contrary. The applicant's invention achieves a broadened sweet spot by decreasing the trampoline effect in the mid-portion of the barrel, while retaining lateral portions that still serve in this manner to provide satisfactory batting performance.

These observations on Vacek are so important, the applicant will address them further, below, in order to be absolutely clear as to the distinction between the applicant's and Examiner's understanding of Vasek.

Claim 38

Claim 38 of the pending application in its entirety as presently presented provides as follows:

38. A tubular bat with a longitudinal axis comprising a cylindrical handle portion for gripping, a cylindrical tubular barrel portion of given length for striking, the barrel portion having a barrel wall with a barrel wall thickness and distinct locations

including a sweet spot area within its length, and a tapered portion connecting the handle portion and the barrel portion, wherein the barrel portion has:

- a) a distal end remote from the handle;
- b) a proximal end where the tapered portion connects to the handle portion;
- c) a mid-section within the barrel portion, the mid-section being of shorter length than the length of the barrel portion and including the sweet spot area; and
- d) two lateral regions extending on either side of the mid-section towards the distal and proximal ends respectively,

the radial stiffness of the barrel wall being greater in the mid-section of the barrel portion than in the two lateral regions of the barrel portion

wherein the barrel wall of the barrel portion consists essentially of polymer composite material which contains reinforcing fibers and the barrel wall in the mid-section contains a higher percentage of fibers than in the lateral regions

to provide the barrel wall with said radial stiffness in the mid-section that is greater than the radial stiffness of the barrel wall within the two lateral regions of the barrel portion and thereby with a broadened sweet spot."

The interpretation of this claim as it is to be applied to Vacek requires an understanding as to the meaning of the "barrel portion" as referenced in both of these documents

Meaning of "barrel portion"

It is clear from the text of the applicant's specification that the use of the expression "barrel portion" refers to the portion of the bat used for striking a ball. References to this effect may be found as follows:

[0002} a cylindrical barrel portion for striking,

[0003] the barrel or hitting portion of the bat frame....

[0051] a cylindrical tubular barrel portion 9 for striking or hitting,...

Claim 1. A tubular baseball bat comprising a cylindrical handle portion for gripping, a cylindrical tubular barrel portion for striking, ...

Claim 38. A tubular bat with a longitudinal axis comprising a cylindrical handle portion for gripping, a cylindrical tubular barrel portion of given length for striking,

Thus the "barrel portion" of a bat is used within the claims of the specification as indicating the portion of a bat which is intended for striking the ball.

The distal end of all barrels of baseball bats are not intended for striking a ball. Such ends are traditionally closed by an end cap. A permanently attached end cap is required by regulatory agencies. An end cap is not depicted in the immediate specification of the applicant. But it is referred to as follows:

[0047] Though not indicated in Figs. 1 through 8, bats of the present invention, as do bats of the prior art, include a traditional knob (not shown in the drawings) at the handle portion end 5 and a traditional end cap (not shown in the drawings) at the barrel portion end 4, both of which can be made from a variety of materials.

However, the portion of the bat that engages with an end cap does not qualify as the barrel portion intended for striking the ball. This distinction is important because of the depiction of the presence of an end cap 130 in Figure 2 of the Vacek reference, as relied upon by the Examiner, and its effect on the meaning of the barrel portion of Vacek. The meaning of barrel portion in respect of Vasek is relevant to the location of the insert in Vacek.

Location of Insert in Vacek disclosure

Vacek in Figure 2 depicts an all polymer composite insert 112 located within the "tubular hitting surface or barrel 110" (cf para [0036]) of Vacek's bat. As Vacek states in paragraph [0036] of his pending application:

"A composite sleeve 112 is added within the body 140 of the bat and more specifically within the tubular hitting surface 110."

This hitting surface is referred to as a "barrel" in paragraphs [0036], [0038], [0041], {0044}, [0046], [0052], [0055], [0062], [0064], [0065] and [0066] of Vacek.

Also in paragraph [0036] the Vacek specification states:

"A plug 130 is molded to the free end of the hitting surface 110. The plug 130 is typically molded into the free end of the bat 100 using a separate process."

Note that the plug 130, corresponding to an end cap, is said to be fitted into the free end of the bat 100. Thus Vacek himself distinguishes between the distal end of the bat and the barrel portion that provides the hitting surface 110.

In Figure 2 of Vacek the insert or sleeve 112 is shown as being fitted within the tubular hitting surface 110. Accordingly, it cannot be said in respect of Vacek, as recited in Claim 38 of the presently pending application, that the barrel portion in Vacek has:

- "38.c) a mid-section within the barrel portion, the mid-section being of shorter length than the length of the barrel portion and including the sweet spot area; and
- d) two lateral regions extending on either side of the mid-section towards the distal and proximal ends respectively,
the radial stiffness of the barrel wall being greater in the mid-section of the barrel portion than in the two lateral regions of the barrel portion..."

Vacek does not meet these requirements because Vacek lacks the two lateral regions extending on either side of the mid-section.

Examiner's interpretation of Vacek insert

The Examiner has stated that (page 5):

"Vacek's insert 112 provided in the center of the barrel contains layers of fibers and thus this portion of the bat barrel has a greater percentage of fibers than do the portions of the barrel at either end of the bat insert",

In fact, there are no "portions of the barrel at either end of the bat insert", as stated by the Examiner. The insert 112 in Vacek extends, at its distal end, to the outer end of the tubular hitting surface or barrel 110. The balance of the bat length is occupied by the plug 130. There is in Vacek no portion of the hitting portion of the bat that extends outwardly beyond the insert 112 at the distal end of the bat.

The Examiner further attributes to Vacek as follows (page 5):

"Vacek specifically points out.... that [the insert] enhances the hitting zone of the bat by increasing the trampoline effect. This is considered an increased or broadened sweet spot"

As established earlier, there is absolutely no basis for the Examiner to conclude, on the basis of the disclosure in Vacek, that the insert as depicted in Vacek "enhances the hitting zone of the bat by increasing the trampoline effect...(in such a way as to create) an increased or broadened sweet spot." Vacek decreases the trampoline effect and does not broaden the sweet spot. Vacek's treatment does not address the sweet spot and it is wrong to conclude that it had the effect of broadening the sweet spot.

Increasing the trampoline effect in a bat does not necessarily increase or broaden the sweet spot. If this were so, then broadened sweet spots would have been created years ago when the concept of increasing the trampoline effect was first appreciated. The sweet spot is enhanced by creating a mid-section in the barrel that has higher radial stiffness than the radial stiffness on the two lateral sides. Vacek does not disclose or suggest this feature in any way.

Further, it is a feature of the invention that the trampoline effect is preferentially decreased in the mid-portion of the bat barrel in order to provide a broadened sweet spot, as increasing stiffness decreases the trampoline effect. Paragraph [0064] of the present application, which describes Figure 6, as filed read as follows:

[0064] A third embodiment of the present invention Fig. 6 is a single wall tubular polymer composite baseball bat which in accordance with the present invention has a localized area of fiber type and/or angle change 20 resulting in increased radial stiffness generally in the sweetspot area 19 located in proximity to the middle area of the barrel length 1.

Apart from the earlier discussion in this Response indicating that statements in Vacek are misleading, the present invention teaches in the opposite direction, namely moving away from an increased trampoline effect in order to create a broadened sweet spot. Accordingly, it is not understood how the Examiner could state (page 5): "Vacek specifically points out.... that [the insert] enhances the hitting zone of the bat by increasing the trampoline effect. This is considered an increased or broadened sweet spot."

As stipulated in Claim 38, a bat according to the invention must meet the following limitations:

"the radial stiffness of the barrel wall being greater in the mid-section of the barrel portion than in the two lateral regions of the barrel portion.....

to provide the barrel wall with said radial stiffness in the mid-section that is greater than the radial stiffness of the barrel wall within the two lateral regions of the barrel portion and thereby with a broadened sweet spot."

There is no basis to say that the disclosure in Vacek comes anywhere near meeting these limitations. There is no basis for the Examiner to say that Vacek has achieved a broadening of the sweet spot.

The Examiner cites paragraph [0047] of Vacek as stipulating that a greater percentage of fibers may be present in the area of the insert - page 5. The Examiner cites paragraph [0046] of Vacek as stipulating that the fiber angle may be varied (Claim 37) - page 6. The Examiner then, on page 6 as previously referenced above, has reiterated that the basis for his rejection of Claim 38 is not that there's a variation of the fiber amount type or angle within the insert 120 of Vacek. Rather, quoting the previous office action, the Examiner presently emphasizes that (on page 6):

"Vacek's insert 112 provided in the center of the barrel contains layers of fibers and thus this portion of the bat barrel has a greater percentage of fibers than do the portions of the barrel at either end of the insert".

And:

"In Fig 2 of Vacek the insert does not extend the length of the barrel and thus the properties of the barrel are varied in the same fashion as claimed."

The applicant appreciates that, from this emphasis, the Examiner is relying on the premise that the insert 112 in Vacek occupies a mid-portion of the barrel and that there are lateral portions on either side of this insert 112 that meet the qualifications of Claims 37, 38 and 39 of: "the radial stiffness of the barrel wall being greater in the mid-section of the barrel portion than in the two lateral regions of the barrel portion". However, the Examiner is incorrectly interpreting Vacek when he makes these statements.

This inaccuracy has been explained above on the basis that there are not found in Vacek any: "... lateral regions extending on either side of the mid-section towards the distal and proximal ends respectively,the radial stiffness of the barrel wall being greater in the mid-section of the barrel portion than in the two lateral regions of the barrel portion..." as stipulated in Claim 38. Much less can there be said to be present in Vacek: "... barrel wall with said radial stiffness in the mid-section that is greater than the radial stiffness of the barrel wall within the two lateral regions of the barrel portion and thereby with a broadened sweet spot."

There may be in Vacek a portion of the barrel, meaning the striking surface, exposed between the insert and the junction of the cylindrical barrel with the taper where the barrel wall radial stiffness is reduced; but there is no such portion present at the distal end of the insert. An insert, or sleeve, internally placed inside an external bat body must for practical purposes extend at the taper end to the taper (otherwise the bat would break with impacts in the area not supported by the insert, and further, would result in objectionable vibrations and sound to the player due to not having contact with the taper). Therefore this gap in the drawings of Vacek is probably a draftsman's artifact.

As the applicant has presently argued, again, it is submitted that the disclosure in Vacek does not depict or suggest the qualifications present in Claim 38.

Claims 37 and 39

The Examiner has rejected Claims 37 and 39 as being the obvious under 35 USC 103 (a), relying on the combination of Vacek and Fritzke. The scheme of Claims 37, 38 and 39, as previously indicated above, is as follows

37. reinforcing fibers at various angles with respect to the longitudinal axis, the reinforcing fibers present within the barrel wall of the mid-section being at a higher average angle with respect to the longitudinal axis than the average angle of the fibers within the barrel wall of the two lateral regions of the barrel portion

38 the barrel wall in the mid-section contains a higher percentage of fibers than in the lateral regions

39 the reinforcing fibers within the barrel wall of the mid-section contain a higher percentage of fibers of higher stiffness than in the lateral regions

The Examiner proceeds to apply 35 USC 103 (a) on the basis that, even in the cases where a different fiber type (Claim 39) or different fiber angle (Claim 37) is used in the insert of Vacek to increase the stiffness in the center of the bat barrel, such alternate techniques for providing increased radial stiffness are obvious.

With respect to this 35 USC 103 (a) obviousness rejection of Claims 37 and 39, the applicant relies on all of its submissions made above respecting Claim 38 namely, that Vacek does not provide a bat with a barrel mid-section that is stiffer than portions of the barrel at either side (meaning at both ends) of the insert. Further, the applicant relies upon the absence of any motivation or suggestion to adapt an analogous aspect of Fritzke for combination with Vacek.

Nature of Insert in Fritzke

The Examiner makes the statement that (page 7): "Fritzke... discloses that such inserts may be shorter and located at the point of the sweet spot of the bat." However, the applicant wishes to point out that, too be more precise, Fritzke does not teach the presence of a shorter insert. Fritzke (US publication 20040157689) does address an "insert-supported barrel and composite-reinforced insert" (paragraph [0069]) wherein "aluminum may be used for the tubular frame 11 and insert 18" (paragraph [0070]). Fritzke further addresses an aluminum bat having an insert with multiple composite layers formed thereon wherein (paragraph [0077]):

"The first composite layer 44 covers a substantial portion of the outer surface of the tubular sleeve while the shorter, second composite layer 46, which is positioned near the center of the insert 18, covers only the portion of the insert 18 where most impacts are likely to occur."

However, it is to be noted that Fritzke addresses the application of composite layers to bat components that are otherwise made of metal e.g. aluminum. Fritzke provides, in paragraph [0057], as follows:

"[0057] Referring now to FIG. 2, the insert 18 comprises a metallic tubular sleeve 24 and a relatively thin composite layer 26 having its greatest strength in a substantially circumferential direction. The composite layer is bonded to the outer surface of the tubular sleeve 24. Preferably, the tubular sleeve 24 is made of the same material as the tubular frame 11. However, it is not critical to use the same materials for both components. A popular material for the bat and the sleeve is high-grade aluminum such as C405 or C555. It should be understood that other materials will suffice. For instance, at a higher cost, titanium or metal matrix composites (such as aluminum matrix composites) can be used for the tubular frame 11 and tubular sleeve 24."

And,

"[0069] The present invention, with its insert-supported barrel and composite-reinforced insert provides several advantages. A conventional multi-wall bat having an aluminum insert exhibits excellent impact response but, due to its relatively thin outer wall, may be prone to denting and have a relatively short useful life. A conventional multi-layer composite insert supported within an aluminum tubular bat helps prevent permanent deformation and optimizes durability but may reduce desirable elastic deflection in the bat due to the high modulus of elasticity of the composite material. The present invention, however, overcomes these shortcomings by combining the elasticity and isotropic shear strength of the tubular sleeve (at the center of this load bearing member) with the circumferential strength of a thin composite material (at the outer surface of the load bearing member) to produce a bat with improved durability and little or no reduction in performance."

The phrase "isotropic shear strength of the tubular sleeve" is a characteristic of a metal and not of polymer composite material. Thus Fritzke contemplates the use of a metallic insert covered with a polymer composite layer. Paragraph [0052] of the present application describes polymer composites as being anisotropic. This teaches away from the concept of the present invention as addressed in Claims 37, 38 and 39.

The distinguishing limitation in Claims 37, 38 and 39 over Fritzke is that: " the barrel wall of the barrel portion consists essentially of polymer composite material". Fritzke does not contemplate an all-composite barrel within his bat. In fact, he is teaching away from that configuration. In paragraph [0008], Fritzke states:

" [0008] While composite materials offer the advantage of a high strength to weight ratio, such materials also present design challenges. Composite inserts and bat frames are prone to wear and tear due to the inter-laminar shear which can occur between bonded layers of composite material. The deflection caused when a ball impacts the bat produces shearing stresses between the composite layers, sometimes causing the bond between adjacent layers to fracture or separate (especially over time)."

Obviously, Fritzke is focused on avoiding resort to an all-composite bat.

It is to be noted that the Examiner's observation (page 7) that Fritzke contemplates use of a composite insert, if this is intended to mean an all-composite insert, is incorrect. The Examiner states: "in both cases a composite insert is utilized". In contrast to the all polymer composite

stipulation made in respect of Claims 37, 38 and 39, Fritzke is focused on strengthening a bat with metal components. Thus, these claims address an all-composite barrel wall in total, which is not a feature contemplated by Fritzke.

The Examiner has suggested that it would be obvious to combine the features of Fritzke and Vacek. Claims 37, 38 and 39 all stipulate for a barrel wall portion which consists essentially of "polymer composite material" wherein the barrel wall has a "radial stiffness in the mid-section that is greater than the radial stiffness of the barrel wall within the two lateral regions of the barrel." The result is the benefit of the invention: to provide a bat with the unanticipated result of a broadened sweet spot.

There is no suggestion or motivation presented by the Examiner which would cause an ordinary workman skilled in the art to choose to combine the Vacek and Fritzke references. Neither of these references recognizes the benefits of providing a broadened sweet spot in the context of an all polymer barrel or any other type of barrel. Fritzke is concentrating on providing strengthened barrel parts that are of hybrid material e.g. metal and polymer composites, so as to combine the best features of each of these two materials. Fritzke is endeavoring to do this while minimizing the weight of the bat. Fritzke is focused on an exercise in minimalism.

Vacek is concentrating on providing a bat of improved performance based upon the use of polymer composite material without reference to any localized strengthening or stiffening of the bat along the striking portion of the barrel. Vacek is talking about changing fiber angles and other parameters from bat to bat to get the different properties from bat-to-bat. Vacek is also focused on achieving improved performance while avoiding the addition of further unnecessary weight to the bat. But Vacek is not addressing changing fiber angles and other parameters within a given bat, or along the length of the barrel of a given bat. Thus these two inventors are pursuing different objectives. This makes it unobvious to combine their teachings.

Accordingly, the applicant submits the Examiner's rejection of Claims 37 and 39, and 38, on the basis of obviousness should not be sustained.

Claims 42/(37, 38, 39); 43/42/(37, 38, 39); 44/42/(37, 38, 39); and 45/42/(37, 38, 39)

The Examiner has further rejected Claims 42 - 45 as referenced above on the basis of the combination of Vacek and Fritzke under 35 USC 103 (a) - obvious. The applicant has now amended Claim 41 which now refers back to Claims 37, 38 and 39 to add the limitation: "wherein the mid-section has a length that is less than 50% of the length of the barrel portion." This is to permit Claims 42-45 to be amended to parallel the range in corresponding claims 63-66 and new claim 72.

The gist of these Claims is now as follows:

40. the midsection has a length that is less than 50% of the length of the barrel portion
42. the mid-section has a length that is less than 33.3 % of the length of the barrel portion.
43. the mid-section has a length that is less than 25 % of the length of the barrel portion.

44. the mid-section has a length that is less than 16 2/3 % of the length of the barrel portion.
45. the mid-section has a length that is less than 12 1/2% of the length of the barrel portion.

By stipulating for a maximum length for the midsection, these claims correspondingly stipulate for the degree of presence of lateral regions having a lesser degree of radial stiffness. Such lateral regions serve to provide bat performance, allowing a bat to perform up to regulatory standards. The stiffening of the mid-section reduces bat performance. The presence of the lateral regions ensures that a degree of bat performance is still preserved.

Apart from all being dependent on Claims 37, 38 in 39 from which these later claims draw patentability, these limitations on the length of the stiffened midsection are not suggested in any manner in Vacek. Nor are they taught explicitly or implicitly in combination with the other limitations of these claims in Fritzke. In objecting to these claims on the basis that Fritzke shows one or two shortened, stiffened portions within his insert, the Examiner is using hindsight based on the applicant's present disclosure of sweet spot control to suggest that a stiffened barrel region as disclosed by Fritzke may be of any proportion.

It is inventive for the present applicant to have stipulated for preferred relative dimensions of the stiffened mid-section portion of the barrel as provided in Claims 41-45 and 63-66. These claims, in stipulating for the proportionate length of the midsection, also indirectly stipulate for the relative size of the lateral regions. The presence and dimensions of such lateral regions are important for achieving the effect of a broadened sweet spot without undue loss of batting performance. This is an unforeseen consequence. Accordingly, these claims contribute further inventive character to the applicant's configurations.

The Examiner states that, absent a showing of unexpected results, the exact length of the mid-section would obviously have been up to the ordinary skilled artisan, depending on the particular bat characteristics desired by the batter in the bat. However, the premise of this assertion overlooks that it had never previously been appreciated that radial stiffness within a bat barrel could be engineered in a way which, while reducing bat performance to some degree, would have the effect of broadening the sweet spot, while permitting a degree of bat performance to be preserved.

Prior to the applicant's filing date of Sept. 29, 2003, there is no evidence in the literature of any knowledge of the unexpected result of broadening the sweet spot area by increasing radial stiffness in an area generally confined to the sweetspot area as opposed to the two lateral regions on either side. Certainly no suggestion of this nature is made in the Fritzke reference. Thus it is not reasonable to conclude that the length, location and other characteristics of the region stiffened would have been readily adopted by an ordinary skilled artisan. Accordingly, it would not have been obvious for a skilled artisans to adopt the variations stipulated in these claims.

Patentability of Claims-53-71

Obviousness rejections - Fritzke and Vacek combined

The applicant has previously asserted reasons why Claims 53-71 should still be under examination. The applicant will now make submissions as to why such claims should be allowable, notwithstanding the existence of Fritzke and Vacek.

There is no suggestion in Fritzke that the following characteristics should be incorporated into a bat:

- wherein the barrel wall of the barrel portion consists essentially of polymer composite material

Much less did Fritzke contemplate incorporating into a bat, as referenced in Claim 56, the feature of:

- the area of greater thickness in the barrel mid-section is integrally formed with the barrel wall portion whereby the thickened portion is formed of the same material as the underlying barrel wall portion without there being present a boundary therebetween.

Fritzke did not contemplate a bat with an all-polymer barrel and Fritzke did not contemplate a bat wherein the barrel mid-section has a thickened midsection which is "integrally formed etc." because Fritzke was addressing a procedure to reinforce an aluminum bat with a polymer composite material overlay.

Vacek did not contemplate a bat with:

"- a mid-section within the barrel portion, the mid-section being of shorter length than the length of the barrel portion and including the sweet spot area; and

- two lateral regions extending on either side of the mid-section towards the distal and proximal ends respectively, the radial stiffness of the barrel wall being greater in the mid-section of the barrel portion than in the two lateral regions of the barrel portion".

Accordingly, with these limitations present in Claims 37-39 and 53 and particularly 57, a new configuration for a bat is created which is even more beyond the imagination of an ordinary workman skilled in the art.

As previously entered, Claim 53 previously included the limitation that there was a minimal 5% thickness difference present in order to provide a sweet spot. However, Claim 53 now relies upon the distinction over Fritzke:

" - wherein the barrel wall of the barrel portion consists essentially of polymer composite material"

With this distinction present in Claim 53, the 5% percentage distinction has been removed from claim 53 and introduced into claim 54 whereby it is present for all dependent claims following thereafter.

Claim 55 stipulates for the limitation that the thickness of the barrel wall is 0.005 to 0.040 inches greater in the barrel mid-section than in the two lateral regions. This claim now depends on the further limitation of Claim 54 that the thickness of the total barrel wall is at least 5 % greater in the barrel mid-section than in the two lateral regions.

Fritzke has stipulated (paragraph 77) that:

" the first composite layer 44 is about 8.5 inches long and about 0.003 inch thick and is positioned on the tubular sleeve 24 such that the first end 48 is about 4.00 inches from the first end 20 of the insert 18. The second composite layer 46 is preferably about 4 inches long and about 0.0055 inch thick and is positioned on the top of the first composite layer 44".

However, there is no basis in the Fritzke reference to confirm the percentage difference in thickness in the thickened portions of Fritzke. The present application stipulates in Claim 54 for a 5% minimum difference in thickness. This limitation further distinguishes over Fritzke.

This feature of extending the thickness differential beyond a certain threshold is not an obvious modification of Fritzke. Fritzke was motivated to strengthen his bat without increasing its weight. In several paragraphs of Fritzke, it is stated:

[0006] an increase in the overall size of the bat undesirably adds weight, often causing reduced bat speed and less slugging distance. (A hitter often can increase bat speed by using a lighter bat, thereby increasing the force transferred to the ball upon impact.

[0066] The composite layer reinforces the sleeve 24, giving the insert greater hoop (circumferential) stiffness and strength in the impact portion (barrel) of the bat. The impact portion receives greater circumferential support, making it less prone to local plastic deformation (or "denting") and hence more durable. At the same time, the composite layer adds very little weight to the bat.

[0078] The thickness of the insert 18 therefore is greatest near the center where there are two concentric layers of composite material and decreases (incrementally) towards the first and second ends of the insert (which are not covered by any composite material). Such an embodiment is advantageous because it provides the greatest thickness and strength in the area where most impacts occur, and less thickness and less weight (and hence greater flexibility) in the area where the stress is less. This design therefore behaves much like a tapered beam. As a result, less material is needed for the tubular sleeve 24 and impact portion 12. Further, by using a shortened second composite layer 46, no more high cost composite material is used than is actually needed.

Therefore there is a teaching in Fritzke against proceeding in the direction of increasing the thickness differential. If the thickness differential is greater than 5%, the present invention teaches that the useful effect of a broadened sweet spot can be achieved. Fritzke did not contemplate this. Fritzke did not recognize at the time of his subject application that the dimensions of the sweet spot would be affected by modifying the thickness of portions of the barrel. Fritzke had no motivation for implementing a thickness differential that is greater than 5%.

On this basis, it is submitted that it cannot be said that the prior disclosure in Fritzke renders Claim 54 obvious.

Other claims

The balance of the claims pending are dependent from claims that this Response has already shown to be allowable. Apart from their additional limitations, such other claims should be allowable based on the fact that they depend from otherwise allowable claims.

Conclusion

With these considerations in mind, the applicant believes that it is fair to state that, prior to the applicant's filing date of Sept. 29, 2003, there is no evidence in the literature for prior art of any knowledge of the unexpected result of broadening the sweet spot area by increasing radial stiffness in an area generally confined to the sweet spot area sufficiently to actually broaden the sweet spot. Thus it is not reasonable to conclude that the character and location of the area stiffened would have been known or foreseeable to an ordinary, skilled artisan. At that time there were generally no skilled artisans making composite bats for commercial production. Thus it is not reasonable to conclude that the character and location of the area stiffened in a composite bat, as addressed by the claims herein, would have been known or foreseeable to an ordinary, skilled artisan.

On this basis, it is believed that a clear distinction has been shown between the cited references and the invention of the present application, as defined by the claims for which protection is presently being sought.

In view of the features and limitations of the claims as amended, it is submitted that the applicant is seeking coverage which is both novel and unobvious, providing an unexpected result over the cited references and over the prior art generally. Accordingly, reconsideration and a favorable ruling which will allow this application to advance to Allowance are therefore requested.

A number of claims are pending in this application on a "withdrawn basis" if the Examiner is prepared to issue an Allowance, the applicant requests an opportunity to review the withdrawn claims to determine whether any of those claims could be presented in a dependent form, referencing claims that are allowable.

Unless the Examiner is prepared to allow the application as now amended, the applicant would like to have an opportunity for an interview and asks that the Examiner to contact the undersigned attorney to make appropriate arrangements. This request was made in respect of the previous Response, but the Examiner did not respond other than to issue a final Office Action. Now we are in a situation where a Final Action has issued. We strongly request that the Examiner respond to applicant's attorney by contacting him in order to arrange for an interview in the event that an Allowance cannot be effected.

Respectfully submitted,

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Schedule C
to the Response the Office Action of October 6, 2006

TUBULAR BASEBALL BATS WITH VARIABLE STIFFENED BARRELS

SUMMARY OF THE INVENTION

[0016].... A main object of the present invention is to provide tubular baseball, and particularly existing bats, with changed (usually decreased) bat performance, without significantly increased weight, in order to meet new or changed performance standards. To achieve this, the bats of the present invention are stiffened in the barrel area of peak bat performance commonly referred to as the sweetspot. Typically, this is an area approximately 2" to 4" in width as compared to barrel portion lengths of 4" to 16". This is achieved by inserting or adding to the bat a circumferential stiffner in the region of the sweetspot.

[0017]..... Though somewhat heavier, a short metallic stiffener could also be employed. *An alternative solution of the present invention to vary stiffness, and thus bat performance, along the barrel portion is to vary thickness along the barrel portion.*

[0020] *A fourth object of the present invention is to provide newly designed tubular all polymer composite baseball bats with a predetermined bat performance with larger sweetspot areas than bats of the prior art. In the present invention this is accomplished by graduating the radial stiffness of the barrel portion along the entire barrel length. Specifically, the peak performance area (generally the sweetspot area) is designed to have the highest radial stiffness while the area of the barrel portion nearest the taper and barrel ends have the lowest radial stiffness and with the barrel portion between the sweetspot and barrel ends being graduated. The resultant effect is a sweetspot area that runs substantially full length of the barrel portion. In the present invention this is accomplished by engineered selection of the composite fiber type(s), fiber size(s), fiber angle(s), and the total composite multi-layered laminate or structure having graduated radial stiffness along the barrel portion length.*

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] The invention will now be described with reference to the accompanying drawings, in which:

[0034] *Fig. 6 shows a longitudinal cross-section of a third embodiment of the present invention showing a single wall polymer composite tubular bat in accordance with the present invention showing a localized area of the fiber type and/or angle change resulting in increased radial stiffness generally confined to the sweetspot area of the barrel portion.*

DETAILED DESCRIPTION OF THE INVENTION

[0050] *The bats of the present invention, shown in Figs. 4, 5, 6, 7 and 8 have similar dimensions to the foregoing prior art bats shown in Figs. 1, 2 and 3.*

[0052] *A polymer composite is a non-homogenous material consisting of continuous fibers embedded in, and wetted by, a polymeric resin matrix whereby the properties of the material are superior to those of its constituent fibers and resin taken separately. Such polymer composites are anisotropic materials since they exhibit different responses to stresses applied in different directions depending on how the fibers are aligned or angled within the matrix.*

[0053] Other materials commonly used in bat constructions such as aluminum, wood and plastics are not anisotropic and are thus limited in controlling bat performance; for example, radial stiffness is equal to longitudinal stiffness and cannot be graduated along the barrel length 1. *However, with composite materials, which are preferred, properties of bats made in accordance with the present invention, such as radial stiffness which determines bat performance can be controlled (i.e. designed to a given requirement) by altering such parameters as the fiber alignments along the bat length 1, and/or the type of fibers chosen, their dernier or layout density and/or the thickness of the polymer composite structure.*

[0062] The thin polymer composite stiffener 18 of the present invention is typically in the order of .005" to .040" thick with length 2" to 6" which is typically less than 50% of the barrel length and is preferably bonded, fully or partially, to the main member 16, or to the secondary member insert 13 of Fig. 7 or to the secondary member sleeve 14 of Fig. 8, or combinations

thereof. *Though not shown, an alternative solution (since stiffness is proportional to thickness) to the stiffener 18 is to vary the barrel thickness 6 along the barrel length 1, either full length or any portion of the barrel length 1 in order to vary bat performance.*

[0063] A second embodiment of the present invention Fig. 5 is a single wall tubular baseball bat which in accordance with the present invention has a thin polymer composite stiffener 18 located externally to the barrel portion 9 generally in the sweetspot area 19 located in proximity to the middle area of the barrel length 1. The resultant stiffened bat results in a calculated lower performance, with a bigger (longer) sweetspot 19, as previously explained.

[0064] *A third embodiment of the present invention Fig. 6 is a single wall tubular polymer composite baseball bat which in accordance with the present invention has a localized area of fiber type and/or angle change 20 resulting in increased radial stiffness generally in the sweetspot area 19 located in proximity to the middle area of the barrel length 1. Though not shown, this embodiment applies equally well to double-wall and multi-wall (more than two walls) tubular all polymer composite baseball bats and is limited to newly designed polymer composite single wall, double-wall, and multi-walled new bats as opposed to field returned bats. Though not shown, the fiber types, and/or fiber angles, and/or fiber sizes, and/or composite thickness can be designed such as to graduate the radial stiffness of the barrel portion 1 along its entire length. That is, the radial stiffness could be highest in the peak performance area (generally the sweetspot area 19) and gradually changing in uniform increments towards the barrel ends where the radial stiffness would be lowest. The resultant effect is a sweetspot area 19 that extends substantially full length of the barrel portion 1.*